

REMARKS

By the foregoing amendments, claims 1 and 4 have been combined. As a result, it respectfully submitted that the rejections based on the Kodama reference have been rendered moot.

Claims 1, 4-6, 10-12, 16, 18 and 20 were rejected under 35 U.S.C. § 103 over Gruenwald in view of Mikeska '191 and claims 8, 9, 13, 17 and 19 were rejected under 35 U.S.C. § 103 over Gruenwald in view of Mikeska '191 and JP'150. These rejections are respectfully traversed.

Ceramics generally undergo a large dimensional change, i.e. shrinkage, in the X, Y and Z directions when they are sintered. This can cause major problems. To address the problem, a number of methods have been proposed. It will be appreciated that an already sintered plate will not undergo shrinkage during firing and as a result, it is not possible to co-fire an unsintered laminate together with a sintered ceramic plate in the normal firing process. It is thus not possible to obtain a multilayer ceramic substrate in a desirable shape when it includes a sintered plate arranged between primary faces of a pair of green layers.

In the so-called non-shrinkage method, shrinkage of the green ceramic laminate in the plane (X-Y) direction is largely restrained while the laminate shrinks considerably in the lamination (Z) direction during firing and the surface of the resulting laminate will be greatly warped or distorted as a result of the firing. In the present invention, that problem is addressed by providing a sintered plate having an area smaller than the area the primary face of the green layer for the substrate on which the plate is arranged and disposing the sintered plate in the cavity formed in the green layer. Here also, the sintered plate does not shrink upon firing and it has been found that it is possible to retard warping or distortion of the surface of the laminate during

firing provided the sintered plate is thin enough in the Z direction, i.e., it is thinner than the thickness of the green layer.

Gruenwald discloses a method of making a multilayer circuit having incorporated capacitance in the form a dielectric sandwiched between a pair of electrodes. As described from column 1, line 63 to column 2, line 28, the capacitance is pressed into a green sheet 11 to achieve the structure shown in Figure 3. Here, one portion of the capacitance forms a part of the surface of the green sheet. The Office Action refers to a fired dielectric 3 as the equivalent of the sintered plate in the present invention. Ignoring the deformation that use of a fired dielectric would cause in such an arrangement, it should be noted that most of dielectric 3 is below the surface of green sheet 11 with a small portion forming a part of a primary face of sheet 11. None of the dielectric is on the surface.

Figure 4, referenced in the Office Action, shows green sheet 11 with the embedded capacitance abutting another green sheet 13. This is achieved by placing the other sheet 13 on sheet 11 and the resulting stack is then fired. See column 2, lines 29-31. It will be appreciated that at no time is the capacitance (or specifically dielectric 3) between the abutting primary faces of sheets 11 and 13, as called for in the claims under consideration. This is in addition to the failure to teach or suggest a restriction layer, as acknowledged in the Office Action.

Mikeska has been cited to show a restriction layer. Even if it does, no possible combination of Gruenwald and Mikeska will realize the claimed method and product even if use of hindsight was permissible, which, of course, it is not.

JP '150 has been cited solely to show a possible sintering temperature of green sheets and a possible thickness of a dielectric. Even accepting these assertions as correct, the basic deficiency in the combination of Gruenwald and Mikeska is not remedied. Hence the three part combination does not render the invention obvious.

In light of these considerations, it is respectfully submitted that this application is now in condition to be allowed and a withdrawal of all rejections is respectfully solicited.

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Respectfully submitted,

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